REMARKS

By this reply, claims 3, 6, 8 and 14 are cancelled without prejudice or disclaimer, and claims 1, 4, 7, 9-13 and 15-20 are amended, leaving claims 1, 4, 5, 7, 9-13 and 15-20 pending in the application. It is submitted that the claim amendments do not raise any new issue that would require further search and/or consideration, do not add new matter, and place the application in better form for appeal. Accordingly, entry of the amendments is respectfully requested. Favorable consideration and allowance are respectfully requested in light of the above amendments and the following remarks.

Objection Under 35 U.S.C. § 132(a)/Rejection Under 35 U.S.C. § 112, ¶1

The amendments set forth in the Amendment filed on July 21, 2006, were objected to under 35 U.S.C. § 132(a), and claims 1 and 3-20 were rejected under 35 U.S.C. § 112, ¶1. The objection and rejection are respectfully traversed.

By this reply, the term "article" has been changed to "airfoil of a gas turbine blade or vane" in claims 1, 7 and 13. Support for this amendment is provided at page 7, lines 25-31, of the present specification.

The Office Action asserts that the recitation of "a MCrAlY-coating directly on the surface of a single crystal or directionally solidified article" (emphasis added) is not supported by the original disclosure. Applicants respectfully disagree.

As stated in *In re Edwards*, 196 U.S.P.Q. 465, 467 (C.C.P.A. 1978):

> [The] function of [the written] description requirement is to ensure that the inventor had possession, as of the filing date of the application relied on, of the specific subject matter later claimed by him; to comply with the description requirement, it is not necessary that the application describe the claimed invention ipsis verbis; all that is required is that it reasonably convey to

> persons skilled in the art that, as of the filing date thereof, the inventor had possession of the subject matter later claimed by him. (Emphasis added.)

See also M.P.E.P. § 2163.02.

Applicants submit that the specification provides a written description of the claimed "MCrAlY-coating directly on the surface of a single crystal or directionally solidified airfoil of a gas turbine blade or vane" that complies with the requirements of 35 U.S.C. § 112, ¶1. See page 6, line 18 to page 7, line 16 of the specification. As described in the specification, Figure 1 shows an embodiment of a turbine blade 2 with an external surface 5. The external surface 5 is exposed and subjected to attack by oxidation, corrosion and erosion. Figure 1 shows an electroplated coating 6 formed "directly on" the external surface 5. Because the drawings form part of the application, Applicants may rely on the drawings to establish an original disclosure. See M.P.E.P. § 608.04. Accordingly, the features shown in Figure 1 can be claimed and provide support for the claim amendments

Accordingly, it is submitted that the original disclosure would reasonably convey to persons skilled in the art that the inventors had possession of the subject matter recited in claim 1, including, *inter alia*, "a MCrAlY-coating directly on the surface of a single crystal or directionally solidified airfoil of a gas turbine blade or vane," and thus complies with the requirements of 35 U.S.C. § 112, ¶1. Therefore, withdrawal of the objection and rejection is respectfully requested.

Rejections Under 35 U.S.C. § 103

A. Claims 1, 3-5, 7-12, 19 and 20 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,824,205 ("Foster") in view of U.S. Patent Application Publication No. 2001/0004474 to Allen et al. ("Allen"). Claims 3 and 8 have been cancelled. The rejection is respectfully traversed.

Claim 1 has also been amended to incorporate the features of cancelled claim 6. Claim 1, as amended, recites a method of depositing a MCrAlY-coating directly on the surface of a single crystal or directionally solidified airfoil of a gas turbine blade or vane, the method comprising the step of coating the surface of the airfoil only at different local areas with a γ/γ' or γ/β MCrAlY-coating by an electroplating method, wherein the different areas of the surface are coated with different γ/γ' or γ/β MCrAlY-coatings selected according to the required properties in the different areas with respect to one or a combination of oxidation, corrosion, and thermal mechanical fatigue (emphasis added). Because claim 6 was not rejected under this ground of rejection, claim 1 is patentable over the applied references.

Claims 4, 5 and 9-12 depend from claim 1 and thus are also patentable for at least the same reasons as those for which claim 1 is patentable.

Claim 7, as amended, recites a method of repairing a used γ/γ' or γ/β MCrAlY-coating disposed directly on the surface of a single crystal or directionally solidified airfoil of a gas turbine blade or vane, the method comprising coating the surface of the airfoil only at a local area with a γ/γ' or γ/β MCrAlY-coating by an electroplating method (emphasis added).

Applicants submit that the combination of Foster and Allen does not suggest the claimed method of repairing a used γ/γ' or γ/β MCrAlY-coating disposed directly

on the surface of a single crystal or directionally solidified airfoil of a turbine blade or vane. The Office asserts that it would have been obvious to omit Foster's underlying aluminum layer formed on the substrate "if the corrosion protection property of the aluminized layer is not desired." Applicants respectfully disagree.

In the portion of Foster that is reproduced in the Office Action (column 1, lines 43-46), it is disclosed that:

> It has become common practice to coat superalloy components with corrosion resistant material since the superalloy itself will not normally be capable of withstanding the corrosive/oxidative in-service atmosphere. (Emphasis added.)

Foster discloses that one practice in the art is to aluminize the superalloy. Chromising and siliconising are also disclosed as known practices in Foster (column 1, lines 58-65). Foster's method comprises aluminizing, chromizing or siliconizing a substrate, and then depositing, on the coated substrate, an M_1CrAlM_2 layer by electrolytic or electroless deposition. The M_1CrAlM_2 layer is deposited on the underlying aluminized, chromized or siliconized layer applied on the substrate, not directly on the substrate. See Foster at, e.g., the Abstract and column 2, lines 46-54.

Foster does not disclose or suggest that such aluminum, chrome or silicon formed on the surface of a superalloy can be omitted. In contrast, Foster discloses that the superalloy will normally not be able to withstand the corrosive/oxidative conditions that the superalloy is exposed to during service. Consistent with Foster's disclosure that superalloys are prone to corrosive/oxidative attack during service, Foster does not disclose or suggest any embodiment of the method of making a protective coating that does not include the step of aluminizing, chromizing or siliconizing the substrate before applying one layer (i.e., a M_1CrAlM_2 layer) or two additional layers (i.e., a M_1CrAlM_2 layer and a thermal barrier layer) on the coated

substrate. Accordingly, Foster does not suggest modifying the disclosed method by eliminating the step of aluminizing, chromizing or siliconizing the substrate, but instead depositing, directly on the substrate, a γ/γ or γ/β M_1CrAlM_2 layer by electrolytic or electroless deposition. In fact, Foster criticizes a method that forms a CoCrAlYSiHf coating on a Ni base superalloy and then aluminizes the coating (column 2, lines 23-35).

According to Foster itself, the modification of Foster's method proposed in the Office Action to eliminate a required step of the method would make the superalloy components unsuitable for their intended purpose because they would not be able to withstand the environment in which they are used in service. As set forth in M.P.E.P. § 2143.01(V), if a proposed modification would render the art being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.

Applicants further submit that Foster's coating method would result in a different structure that the Office Action has not established is necessarily characterized by a γ/γ' or γ/β phase. The intermediate zone between the aluminized or chromized or siliconized surface would result in a different structure due to the necessary heat treatment of the electrodeposited coating.

Additionally, Foster also does not disclose or suggest a repairing process for a used coating, much less at only a local area of a coating. The Office asserts that Foster teaches the method is used as a repair process for a used MCrAlY coating (page 6, second paragraph), but identifies no disclosure in Foster that supports this assertion.

Foster discloses masking parts of the root and shroud portions (column 7, lines 58-59), but one skilled in the art would understand that Foster's process is not a repair process for a used coating. Rather, Foster's process is the standard process of coating the complete gas-washed airfoil surface. See also Foster at column 8, lines 8-10, which discloses "a coating ... covering the airfoil portions and the root and shroud platforms (emphasis added)."

The Office further asserts that the claimed repair process for a used MCrAlY coating is "an intended use of the invention." Applicants submit that this position is improper. Claim 7 recites a method of repairing a used coating. The repairing of the used coating is not an "intended use," but is the very purpose for which the method is performed. Also, the recitation of "a method of repairing a used γ/γ' or γ/β MCrAlY-coating" (emphasis added) helps define the claimed method, and results in a manipulative difference in that the method recited in claim 7 is necessarily performed on a used coating disposed directly on the surface of a single crystal or directionally solidified airfoil of a gas turbine blade or vane. As such, the Office has failed to give proper weight to this language. See, e.g., *Jansen v. Rexall Sundown, Inc.*, 68 U.S.P.Q.2d 1154, 1158 (Fed. Cir. 2003) discussed at M.P.E.P. § 2111.02(II).

Allen discloses a method for coating an article. Allen does not suggest modifying Foster's method by eliminating the step of aluminizing, chromizing or siliconizing the substrate, but **instead** depositing, directly on the substrate, a γ/γ or γ/β M_1CrAlM_2 layer by electrolytic or electroless deposition. As discussed above, Foster would have led one having ordinary skill in the art away from such modification because Foster discloses that the superalloy would be unable to withstand the environment.

Allen also does not disclose or suggest that the coating method is a repair process for a used coating. It should also be noted that Allen discloses that the coating is applied to the underside of the platform 18 and neck 19 of a turbine blade. See Figure 1 and paragraph [0024] of Allen. Accordingly, because Allen does not cure the deficiencies of Foster, claim 7 is patentable.

Claims 19 and 20 depend from claim 7 and thus are also patentable for at least the same reasons as those for which claim 7 is patentable. Therefore, withdrawal of the rejection of claims 1, 4, 5, 7, 9-12, 19 and 20 is respectfully requested.

B. Claims 6 and 13-18 were rejected under 35 U.S.C. § 103(a) over Foster in view of Allen, and further in view of U.S. Patent No. 6,296,447 to Rigney et al. ("Rigney"). Claims 6 and 14 have been cancelled. The rejection is respectfully traversed.

Claim 1 recites the features of cancelled claim 6. In the claimed method, different areas of the surface are coated by an electroplating method with different γ/γ' or γ/β MCrAlY-coatings. The coatings are selected according to the required properties in the different areas with respect to one or a combination of oxidation, corrosion, and thermal mechanical fatigue. In the claimed method, the different γ/γ' or γ/β MCrAlY-coatings are formed at the different locations to tailor the coating for the conditions experienced at those locations. For example, the leading edge is subjected to very high temperatures, and thus benefits from a different coating composition than the platform, which experiences colder temperatures. In addition, the coatings are formed in a layer. Applicants submit that the applied references do

not disclose or suggest utilizing different coating compositions, acting as one layer, at different locations of an airfoil of a gas turbine blade or vane.

Applicants submit that the combination of Foster, Allen and Rigney does not support a *prima facie* case of obviousness with respect to claim 1. As discussed above, Foster would have led one skilled in the art away from modifying the disclosed method by eliminating the step of aluminizing, chromizing or siliconizing the substrate, and depositing, directly on the substrate, a γ/γ or γ/β M_1CrAlM_2 layer by electrolytic or electroless deposition. According to Foster, such resulting coating would not be suitable for use. Allen does not disclose or suggest coating the recited airfoil of a gas turbine or vane.

Rigney does not cure the deficiencies of Foster with respect to the claimed method. Rigney at least does not disclose or suggest locally coating an article with a γ/γ coating or with a γ/β MCrAlY-coating. In contrast, Rigney describes a turbine component preferably made of a nickel-base superalloy, which is "typically of a composition that is strengthened by precipitation of gamma-prime phrase" (column 7, lines 29-30). The component is a substrate, not a coating. Because Rigney does not suggest a γ/γ or a γ/β MCrAlY-coating, Rigney does not suggest modifying Foster's method to deposit a γ/γ or γ/β MCrAlY coating directly on a surface of a single crystal or directionally solidified airfoil of a gas turbine blade or vane, as recited in claim 1. Thus, claim 1 is patentable over the combination of Foster, Allen and Rigney.

Claim 13, as amended, recites a method of depositing a MCrAlY-coating directly on the surface of a single crystal or directionally solidified airfoil of a gas turbine blade or vane, the method comprising coating the surface of the airfoil only at

local areas with a γ/γ' or γ/β MCrAlY-coating by an electroplating method, wherein different areas of the surface of the airfoil are coated with different γ/γ' or γ/β MCrAlY-coatings (emphasis added). Claim 13 is also patentable.

Claims 15-18 depend from claim 13 and thus are also patentable for at least the same reasons as those for which claim 13 is patentable. Therefore, withdrawal of the rejection of claims 13 and 15-18 is respectfully requested.

C. Claims 1, 3-5, 7-12, 19 and 20 were rejected under 35 U.S.C. § 103(a) over Foster in view of Allen, and GB 2 167 446 A ("GB '446"). Claims 3 and 8 have been cancelled. The rejection is respectfully traversed.

Applicants submit that GB '446 also fails to cure the deficiencies of Foster and Allen with respect to the method recited in claims 1 and 7. For example, GB '446 does not suggest applying a coating locally on the airfoil of a gas turbine vane or blade, as recited in claim 1, or a repair process for a used gas turbine vane or blade, as recited in claim 7. Therefore, withdrawal of the rejection of claims 1, 4, 5, 7, 9-12, 19 and 20 is respectfully requested.

D. Claims 6 and 13-18 were rejected under 35 U.S.C. § 103(a) over Foster in view of Allen and GB '446, and further in view of Rigney. Claims 6 and 14 have been cancelled. The rejection is respectfully traversed.

For reasons discussed above, Rigney also does not cure the deficiencies of Foster, Allen and GB '446 with respect to claims 1 and 13. Therefore, withdrawal of the rejection of claims 13 and 15-18 is respectfully requested.

Conclusion

For the foregoing reasons, allowance of the application is respectfully requested. If any questions arise concerning this response, the Examiner is respectfully requested to contact the undersigned at the number given below.

Respectfully submitted,

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